

## THE CLAIMS

- 1 1. A method of routing packets within a communication system, comprising the steps of:
- 2 receiving a packet from a communications network;
- 3 allocating a message block header within said received packet;
- 4 associating a predefined default value for said message block header;
- 5 identifying a quality-of-service value associated with said received packet;
- 6 metering the received packet to determine whether resources are available to properly route the
- 7 packet while complying with a service level agreement associated with said classified quality-of-service;
- 8 in response to a determination that said packet cannot be routed in compliance with said service
- 9 level agreement, dropping said packet; otherwise, routing said packet
- 1 2. The method of claim 1 further comprising the steps of:
- 2 determining whether said identified quality-of-service value is different than said associated
- 3 predefined default value for said message block header; and
- 4 in response to said determination, overwriting said message block header with said identified
- 5 quality-of-service value.
- 1 3. The method of Claim 1 wherein said step of routing said packet further comprises the steps of:
- 2 determining whether an outgoing device driver is available for said quality-of-service value; and
- 3 in response to a determination that said outgoing device driver is unavailable, queuing said packet
- 4 within one of a plurality of primary queues associated with said identified quality-of-service value.

1 4. The method of Claim 3 wherein said step of queuing said packet further comprises the steps of:

2 assigning a predefined threshold value with each of said plurality of primary queues;

3 monitoring each of said plurality of primary queues to determine whether the capacity level  
4 associated with said queue exceeds said predefined threshold value; and

5 queuing any additional packets, in response to said determination, to one of a plurality of  
6 secondary queues associated with said identified quality-of-service value.

1 5. The method of Claim 4 wherein certain of said plurality of secondary queues are assigned to one  
2 of said plurality of primary queues.

3 6. The method of Claim 5 wherein one of said plurality of secondary queues is an expedited  
4 forwarding queue, further comprising the steps of queuing said packet identified as expedited  
5 forwarding value within said expedited forwarding queue.

6 7. The method of claim 3 wherein said plurality of primary queues comprises of:

1 a high priority egress queue;

2 a medium priority egress queue; and

3 a low priority egress queue.

4 8. The method of Claim 1 wherein packets identified with particular one of said quality-of-service  
5 value is guaranteed a predefined bandwidth within said communication system.

1 9. A packet router within a packet communication network for providing differentiated services  
2 based on a service level agreement associated with a plurality of incoming packets to be  
3 processed and routed within said packet router, comprising:

4 a ingress driver for receiving said plurality of incoming packets;

5 a classifier coupled to said ingress driver for classifying each of said plurality of packets with a  
6 particular behavior aggregate value wherein said behavior aggregate value is indicative of the internal  
7 routing treatment to be provided by said packet router for said each packet;

8 a meter coupled to said classifier for evaluating some of said plurality of packets and discarding  
9 certain ones of said packets wherein the service level agreement associated with said identified behavior  
10 aggregate value cannot be guaranteed;

11 a differentiated queuing block coupled to said meter and said classifier for handling said plurality  
12 of packets; and

13 a egress driver coupled to said differentiated queuing block for transmitting some of said plurality  
14 of packets over said packet communications network.

1 10. The packet router of Claim 9 wherein said ingress driver further comprises means for allocating a  
2 message block header for each of said packets for storing said behavior aggregate value.

3 11. The packet router of Claim 10 wherein said egress driver comprises means for stripping said  
4 message block header within each of said packets before transmitting each of said packet over  
5 said communications network.

6 12. The packet router of Claim 10 wherein said classifier further comprises a table for mapping a  
7 differentiated services code point (DSCP) stored within each of said packets to an associated  
8 behavior aggregate value and means for storing said behavior aggregate value within said  
9 message block header.

1 13. The packet router of Claim 9 wherein said classifier further comprises a filter for determining  
2 whether particular ones of said plurality of packets need to be evaluated by said meter and  
3 forwarding such determined packets to said meter.

1 14. The packet router of Claim 9 wherein said differentiated queuing block further comprises a  
2 plurality of primary queues for queuing some of said packets when resources within said egress  
3 driver are not available.

1 15. The packet router of Claim 14 wherein some of said packets are classified as expedited  
2 forwarding, assured forwarding or best efforts forwarding and wherein said plurality of primary  
3 queues further comprises:

4 a high priority egress queue for queuing packets that are classified expedited forwarding;

5 a medium priority egress queue for queuing packets that are classified assured forwarding; and

6 a low priority egress queue for queuing packets that are classified best effort forwarding.

7  
1 16. The packet router of Claim 15 wherein said differentiated queuing block further comprises a  
2 plurality of secondary queues for queuing some of said packets when certain one of said primary  
3 queues exceeds a predefined threshold content value.

1 17. The packet router of Claim 16 wherein said plurality of secondary queues further comprises:

2 an expedite forwarding queue for queuing packets that are classified expedited forwarding;

3 an assured forwarding queue for queuing packets that are classified assured forwarding; and

4 a best effort queue for queuing packets that are classified best efforts forwarding.

1 18. The packet router of Claim 17 wherein each of said secondary queues further comprises a token  
2 bucket meter for keeping track of the bandwidth rate available for said associated behavior  
3 aggregate value.

1 19. An apparatus for providing differentiated service routing within a packet communication system,  
2 comprising the steps of:

3 means for receiving a packet from a communications network;

4 means for allocating a message block header within each of said received packet;

5 means for assigning behavior aggregate value for each of said received packets;

6 means for metering some of said received packets to determine whether resources are available to  
7 properly route said packets while complying with a service level agreement associated with said behavior  
8 aggregate value;

9 in response to a determination that a particular packet cannot be routed in compliance with said  
10 service level agreement,

11 means for dropping said packet;

12 otherwise, means for routing said packet.

1 20. The apparatus of Claim 19 wherein said means for routing said packet further comprises:

2 a plurality of primary queues;

3 means for determining whether an outgoing device driver is available; and

4 in response to a determination that said outgoing device driver is unavailable, means for queuing  
5 said packet within one of said plurality of primary queues.

1 21. The apparatus of Claim 20 wherein said means for queuing further comprises:  
2 a plurality of secondary queues;  
3 means for assigning a predefined threshold value with each of said plurality of primary queues;  
4 means for monitoring each of said plurality of primary queues to determine whether the capacity  
5 level associated with said queue exceeds said predefined threshold value; and  
6 means for queuing any additional packets, in response to said determination, to one of said  
7 plurality of secondary queues.

1 22. The apparatus of Claim 21 wherein certain of said plurality of secondary queues are assigned to  
2 particular one of said plurality of primary queues.

1 23. The apparatus of Claim 21 wherein said plurality of secondary queues comprises:  
2 an expedited forwarding queue;  
3 an assured forwarding queue; and  
4 a best effort queue.

1 24. The apparatus of Claim 20 wherein said plurality of primary queues further comprises:  
2 a high priority egress queue;  
3 a medium priority egress queue; and  
4 a low priority egress queue.